

RESPONSE

Support

Applicants have amended claim 1 to specify that the percent ranges specified for component (B)(1) and the combination of components (B)(1) and (B)(2) are with regards to the lubricant composition. Support for these amendments is found in the claims themselves as well as on page 13, lines 10 to 23 of the specification.

Applicants have amended claim 10 by removing a “(b)” label, making the claims consistent with amended claim 1. Support is found in the claim itself.

Applicants have amended claim 13 to remove the “(3)” from the claim. Support for this amendment is found in the claim itself.

Applicants have amended claim 14 to depend on claim 1 and also by inserting Markush group language. Support for this amendment is found in the claim itself.

Applicants have amended claim 1 to specify that component (B)(1) is a reaction product of a fatty hydrocarbyl-substituted monocarboxylic acylating agent and a polyamine where the reaction product comprises a heterocyclic reaction product. Support for this amendment is found in the itself as well as the specification.

Applicants have also amended claim 1 to specify that component (B)(2) is a Mannich reaction product, removing the aminophenol from the claim. Applicants have also amended claim 1 to specify that component (B)(3) is present from 0.1 ppm to 25 percent by weight. Support for these amendments is found in the claim itself (in regards to component (B)(2)) and on page 16 lines 19-21 of the specification.

Applicants have cancelled claims 9 and 16-20.

No other elements of the claims have been changed.

Response

The Examiner has objected to claims 1 and 13-14 due to several informalities. Claims 1, 3, 14 and 16 have been amended as the Examiner suggests. In light of these amendments Applicants ask that all objections be removed.

The Examiner has rejected claims 16-20 under 35 U.S.C. 103(a) as unpatentable over Blythe (US 5,264,005) in view Patel (US 5741764). Applicants have cancelled claims 16 to 20 making these rejections moot.

The Examiner has rejected claims 1, 3, 5-10 and 12-14 under 35 U.S.C. 103(a) as unpatentable over Blythe (US 5,264,005) in view of Patel (US 5741764) further in view of Teacherson (US 2004/0083729). Applicants respectfully disagree.

Before discussing the remaining rejections in detail, Applicants note that the Examiner cited several typos in the data table of a previous response. Specifically, the totals for (B)(1)+(B)(2) were incorrect for Examples 4, 5 and 6 in Table 1 of the response dated December 16, 2009. The Examiner's totals are correct for these examples: 9.6% for Example 4, 7.05% for Example 5, and 9.4% for Example 6. Applicants regret the addition errors in the table. Applicants present Tables I and II below with the corrected values in Table I and updated Example labels (comp vs inv). Applicants have also added a new row to Table 2 showing the total treat of components (B)(1), (B)(2) and (B)(3) combined. Please note that the claims now define (B)(2) as the Mannich additive. The amounts of Aminophenol have been retained in the tables for comparison. The Inventive Examples are 6, 9, 10, 11, 12 in Table 1 and G and H in Table 2.

Table 1 – Test Results From the Specification and Previous Declaration

Ex No <i>Claims Require</i>	%(B)(1) <i>(1.6 to 3.5 %wt)</i>	%(B)(2) <i>(Mannich)</i>	%(B)(1)+%(B)(2) <i>(5.5 to 15 %wt)</i>	%(B)(3)	Power Valve Rating ³
1 (Comp)	0	0	0	0	2.1
3 (Comp) ¹	1.2	6.6 APhenol	7.8	0.3	3.1
4 (Comp) ¹	3.0	6.6 APhenol	9.6	0.3	3.8
5 (Comp) ¹	1.15	5.9 APhenol	7.05	0	2.8
6 (Inv) ²	2.0	7.4 Mannich	9.4	0.5	4.6
7 (Comp)	6.0	0	6.0	0.3	3.4
8 (Comp) ¹	6.0	4.8 APhenol	10.8	0.3	4.3
9 (Inv) ²	1.6	4.0 Mannich	5.6	0.5	3.8
10 (Inv) ²	1.6	5.0 Mannich	6.6	0.5	4.4
11 (Inv) ²	1.6	6.0 Mannich	7.6	0.5	3.5
12 (Inv) ²	1.6	9.1 Mannich	10.7	0.5	5.5

1 – The “APhenol” in Example A refers to an aminophenol additive, as described in footnote e under the Table that starts on page 20 of the specification.

2 – The “Mannich” in Example A refers to a Mannich reaction product additive, as described in footnote h under the Table that starts on page 20 of the specification.

3 – A power valve rating of 3 or higher is internally considered an “acceptable” result, however higher results indicated better performance and a rating of 3.5 or higher is internally considered to be a “superior” result.

Table 2 – Results of New Examples A to J

Test Results	Ex A Comp	Ex B Comp	Ex C Comp	Ex D Comp	Ex E Comp	Ex F Comp	Ex G INV	Ex H INV	Ex I Comp	Ex J Comp
(B)(1) (1.6-3.5 wt%)	1.2	1.2	3.0	1.2			2.0	2.0	1.0	4.0
(B)(2) (A) = Aminophenol (M) = Mannich	11.1 (A)	11.1 (A)	11.1 (A)	11.1 (A)	9.9 (M)	9.9 (M)	9.9 (M)	8.6 (M)	8.6 (M)	8.6 (M)
(B)(1)+(B)(2) (5.5-15 wt%)	12.3	12.3	14.1	12.3	9.9	9.9	11.9	10.6	9.6	12.6
(B)(3)	0.3	0.3	0.3	0.3		0.5	0.5	0.5	0.5	0.5
(B)(1)+(B)(2)+(B)(3)	12.6	12.6	14.4	12.6	9.9	10.4	12.4	11.1	10.1	13.1
Completed Test Hours	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
Piston Varnish Rating ²	9.0	9.1	9.4	8.75	7.3	6.9	8.9	9.2	9.0	9.2
Undercrown Rating ²	6.4	6.0	6.3				5.2	6.3		
Piston Scuffing Rating ²	9	9	9	9	5	8	8	9	9	9
Piston Crown Rating ²	8.7	8.4	8.6	8.9	8.7	9.2	8.8	8.9	8.8	8.8
Ring Stick Rating ²	10	10	10	9.0	7.2	8.1	5.0	9.0	8.9	9.0
Power Valve Rating ³				3.8			4.9	4.6	4.5	4.9
										5.0

2 – The piston varnish, undercrown, piston scuffing, piston crown and ring stick ratings are indicate the cleanliness and/or amount of damage to the described area and/or part at the end of the test. Higher ratings indicate better results.

3 – A power valve rating of 3 or higher is internally considered an “acceptable” result, however higher results indicated better performance and a rating of 3.5 or higher is internally considered to be a “superior” result.

In Table 2 above, poor power valve ratings (less than 3.5) are marked in red boxes while good results are marked in green boxes (3.5 and higher). Similarly, poor undercrown ratings are marked in red boxes (less than 5.2) while good results are marked in green boxes (5.2 and higher).

In the current office action the Examiner has basically maintained a finding that the data provided is not commensurate in scope with the claims. The Examiner has suggested that Applicants consider the following to overcome the current rejections:

- (1) The Examiner suggests Applicants add a concentration for the (B)(3) friction modifier to the claims.
- (2) The Examiner suggests Applicants limit (B)(1) to additives derived from the reaction of isostearic acids with polyethylene polyamines.
- (3) The Examiner suggests that Applicants compare the oils of the specification and declarations to those in the prior art.
- (4) The Examiner suggests that Applicants show the difference between the hydrocarbyl-substituted aminophenol dispersants and the Mannich dispersants.

Applicants have amended the claims as the Examiner suggests with regards to item (1) and item (2). With regards to items (3) and (4), Applicants respectfully submit, in light of the amendments and remarks herein, these suggestions are either moot and/or are not necessary and the current claims are both novel and nonobvious over the cited references.

With regards to item (2) the Examiner has suggested limiting the (B)(1) component to additives derived from the reaction of isostearic acids with polyethylene polyamines. Applicants have further narrowed component (B)(1) as the Examiner suggested but not to the extent the Examiner suggested. Applicants have specified that component (B)(1) is a reaction product of a fatty hydrocarbyl-substituted monocarboxylic acylating agent and a polyamine wherein the reaction product comprises a heterocyclic reaction product. This claim scope is adequately supported by the data presented, which shows an additive derived from isostearic acids (a fatty hydrocarbyl-substituted monocarboxylic acylating agent) and a polyethylene polyamine (a polyamine). There is no reason to expect the results shown with the isostearic acid-polyethylene polyamine additive will not carry over to similar additives derived from other a fatty hydrocarbyl-substituted monocarboxylic acylating agents and/or other polyamines. Applicants remind the Examiner that this is all that is needed in this situation. MPEP §2145 states in part (*emphasis added*):

When considering whether proffered evidence is commensurate in scope with the claimed invention, *Office personnel should not require the applicant to show unexpected results over the entire range of properties possessed by a chemical compound or composition*. See, e.g., *In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987). *Evidence that the compound or composition possesses superior and unexpected properties in one of a spectrum of common properties can be sufficient* to rebut a *prima facie* case of obviousness. *Id.*

For example, *a showing of unexpected results for a single member of a claimed subgenus, or a narrow portion of a claimed range would be sufficient* to rebut a *prima facie* case of obviousness if a skilled artisan "could ascertain a trend in the exemplified data that would allow him to reasonably extend the probative value thereof." *In re Clemens*, 622 F.2d 1029, 1036, 206 USPQ 289, 296 (CCPA 1980) (Evidence of the unobviousness of a broad range can be proven by a narrower range when one skilled in the art could ascertain a trend that would allow him to reasonably extend the probative value thereof.).

In other words, given the data provided, which uses an isostearic acid-polyethylene polyamine derived additive, one skilled in the art would be able to extend the value of this showing to similar additives derived from fatty hydrocarbyl-substituted monocarboxylic acylating agents and a polyamines.

Therefore the present claims are commensurate in scope with the data provided at least in respect to component (B)(1), addressing Examiner's item (2) in the current office action. In any event, claim 8 of the present claim further limits component (B)(1) such that the Examiner should agree that at least that claim fully addresses item (2).

With regards to items (3) and (4), Applicants note that the present claims have been amended to specify that component (B)(2) is the Mannich additive. In addition to the comparison to the prior art references already provided, the data presented also shows that the Mannich additives work surprisingly better than the aminophenol-containing examples.

The Examiner suggests that the data provided in the declaration signed by Ms. Laimute Svarcas may not show anything unexpected as the results appear to be explained by increased treat rate providing improved performance. Applicants respectfully submit that, given the current amendments, the data should be reconsidered and provide the additional comments below. Applicants also note that the Examiner should consider all of the data provided, not just the power valve rating. While important, the Examiner is correct that there can, in some situations, be a correlation between power valve rating and treat rate. However higher treat rates often cause other problems beyond the obvious down side of increased cost. For example, engine cleanliness can suffer with increased treat rate, and so the additional data, particularly the undercrown ratings, must also be considered. The present invention must balance the power valve rating with engine cleanliness, as indicated by the undercrown ratings, which highlights the criticality of the ranges and features of the present claims.

In particular, looking at Table 2, Inventive Example G, the results show a "superior" power valve rating (3.5 or higher) and the best undercrown rating the immediate sample set (E-G). Comparative Example E gives a poor power valve rating and a worse undercrown rating. Comparative Example F gives a good power valve rating but the worst undercrown rating in both the immediate sample set and the entire set in Table II. Only Inventive Example G (in the immediate set) provides good results

in both the power valve rating and the undercrown rating. Furthermore, while the power valve rating in Examples E-G improves with higher overall treat rate, the undercrown rating does not track treat rate, with Example F, the example with the middle treat rate of 10.4 giving the worst undercrown rating. The piston varnish rating results match the undercrown ratings while the other results are mixed. Overall, Example G gives the best overall results in the immediate sample set (E-G), and while it has the highest treat rate (of the (B) components) it avoids the negative effects that can occur and which are demonstrated when comparing Example E (9.9% treat of (B) components) to Example F (10.4% treat of (B) components).

Looking now at the H-J sample set, the same conclusions may be drawn. Inventive Example H provides the best overall results with a good power valve rating and the best undercrown rating of the immediate set. Inventive Example H does not have the highest treat rate of (B) components in the set, rather Example J does. Examples J and I both have good power valve ratings but have undercrown rating inferior to the Inventive Example. All the other ratings are comparable across the immediate sample set. Therefore, the results show the present invention provides the best overall results (specifically balancing power valve rating and engine cleanliness as demonstrated by undercrown rating). The Inventive Example in the immediate set does not use the highest treat rate of (B) components and so the improved results are merely the product of increased treat rate.

Finally, Applicants note that Examples A-D, which are all aminophenol-containing comparative examples, further support Applicants's position. The Examples show that the Mannich additives required by the present claims provide significantly better results compared to the aminophenol examples even when used at lower overall treat rates. The only example in this immediate set with results comparable to the inventive examples is Comparative Example C, which still gives a barely comparable power valve rating of 3.8 and uses the highest component (B) treat rate in the table.

If anything, this data shows that while the Mannich additives may more effectively improve power valve ratings, they are not as effective at maintaining engine cleanliness as the aminophenols. The present invention allows for the use of the power valve rating boosting Mannich additives without taking the hit in engine cleanliness one would normally expect. Thus the present invention provides an unexpected result and the current claims are both novel and nonobvious over the cited references.

Conclusion.

For the foregoing reasons it is submitted that the present claims are novel and unobvious over the cited reference, and in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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